D. FOLSOM


# The Potato News Bulletin

Published Monthly by

The Potato Association of America

VOL. II. NO. 11 NOVEMBER, 1925


60.12

## HILL-UNIT SELECTION OF POTATOES

J. R. Livermore, Cornell University, Ithaca, N. Y.

The past few years there has been considerable controversy among scientific men as to whether hill selection of potatoes is of value. Whether or not it is possible to isolate or separate high-yielding strains of potatoes out of a mixed population as it occurs in the field. Furthermore, granting it is possible to obtain these high-yielding strains, can they be maintained after they have been isolated.

The purpose of the present paper is to present a few facts substantiated by data from some potato selection experiments carried on in Erie County in cooperation with the Erie County Farm Bureau. This work was started by Dr. C. H. Myers in 1920 and for the past four years has been carried on by the writer.

The methods used will be but briefly described here, they are given in complete detail in a recent publication (1). Starting with selected hills in the fall or tubers in the spring, a seed plot was planted. In the fall, all but a few of the better ones were discarded. The next year a duplicate series of these selected strains and a row of unselected field run stock for a check, were planted in the seed plot.

The third and subsequent years, the selected strains and check were replicated four times, i. e., a row of each strain and a row of field run stock was planted in five different parts of the seed plot. This is ample to reduce the experimental error to such a point that the data are reliable. These are single rows replicated. Salaman (2) has found that long, narrow plots are desirable from the standpoint of accuracy.

Each year the seed plot was thoroughly rogued; if any diseased hills were found in a row the entire planting from that strain was destroyed. Each fall the yields of each row were recorded and the better ones selected to carry on. The usual procedure was about 50 hills or tuber units the first year, 15 selected strains the second year, 10 the third year and 7 or 8 the fourth year.

In none of our work did we attempt to isolate the best strain. We feel that this is very hard to do under field conditions. We do feel confident, however, that we can isolate the best three or four strains from a population. Although they may not be in the same order each year, yet they are usually found among the best four or five every year of the test.

Since it requires a minimum of four years to complete the selection process among a given population of selected hills, we have complete data on only seven farms in Erie County. Data from the last three years of a test are used in these comparisons since during that time only, were the strains tested with an adequate number of replications to insure a fair degree of accuracy. In two plots the three best strains appeared among the four highest in all of the three years. In three plots the three best strains appeared among the five highest in all three years. In one plot the three best placed among the high four strains twice in the three years. In the last plot, two of the three best strains appeared in the first five twice in three years. In five plots out of the seven, the three best strains ranked among the five highest yielding strains all three years.

The following table shows the ranking for two of the plots, one of the consistent lot and the one that was most inconsistent:

TABLE I.

**Ranking of the Strains for Last Three Years of Test**

| Rank | Strain Numbers | | | Rank | Strain Numbers | | |
|---|---|---|---|---|---|---|---|
| 1 | 32 | 48 | 32 | 1 | 32 | 22 | 32 |
| 2 | 48 | 32 | 48 | 2 | 41 | 39 | 9 |
| 3 | 43 | 35 | 35 | 3 | 17 | 17 | 39 |
| 4 | 35 | 43 | 43 | 4 | 37 | 41 | 34 |
| 5 | 44 | 44 | 44 | 5 | 39 | 32 | 27 |

It is well to keep in mind that these differences in yield which we are measuring, are not due to varying amounts of disease present. Every year the seed plots are thoroughly rogued. If any row shows any diseased plants or weak hills the entire row, vines, tubers and seed piece, are removed from the plot and destroyed. The four replicates of this row will also be destroyed.

In this matter of disease it might be of interest to note the decrease of disease in the plots as the selection process goes on. There were nineteen hill-selection plots in various parts of state this year which we were carrying on in cooperation with the individual growers. Ten of these were new men, their plots were rogued quite severely, mosaic being the chief offender. Three plots in their second year, rogued out about 5 per cent leaf roll. Of the two plots in the third year of test, one was free from disease, the other had only one hill of leaf roll in the entire plot. Of the four men who finished this year, three plots were clean, the fourth

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had six hills of leaf roll distributed among the four rows of one strain.

It is readily seen from the above statements that whatever difference appears in the latter two or three years of the test, must be due to some other cause than disease. The effect of soil differences, cultivation, spraying and the like, on any one strain due to its location in the plot is discounted by the number of replications. It has been found by Myers and Perry (3) and Westover (4) that four replications of a forty foot row of potatoes, reduces the experimental error to such a point that further replications or longer rows lower the error by only a slight amount.

The only factor left to account for the defference in yield is the inherent capacity of tubers from one hill to produce at a different rate than the tubers from another hill. We feel confident that our method of testing the various strains is adequate to isolate the better strains. In Table 2 the data given from seven Erie County farms is certainly indicative, if not quite conclusive, that it is possible to isolate strains of potatoes that will yield more than field run stock.

TABLE II.

**Results of Three Years Hill Selection in Erie County**

| Cooperator | Av. yield selections, bu. per acre | Av. yield unselected, bu. per acre | Gain of selections, bu. per acre | Odds |
|---|---|---|---|---|
| McKeary | 261.5 | 239.8 | 21.7 | 4:1 |
| Webster | 277.8 | 227.9 | 49.9 | 5:1 |
| Pagels | 300.4 | 225.7 | 74.7 | 4:1 |
| Larkin | 248.8 | 212.6 | 36.2 | 26:1 |
| Eiss | 273.5 | 230.6 | 42.9 | 100:1 |
| Briggs | 287.0 | 238.5 | 48.5 | 131:1 |
| Hewitt | 255.1 | 205.9 | 49.2 | 120:1 |
| Average | 273.3 | 225.0 | 48.3 | |

The odds as given in table 2 are calculated by Love's (5) modified Student's Method. Odds greater than 30:1 indicate a significant difference. In the case of the first three plots where the odds are so low, no yield of the check was obtained in the first year. Since only two years' comparisons were available, the odds were bound to be low unless exceptional agreement occurred between the two things being compared. Such a condition is rare in biological work.

It is worthy of note that the increased yield of the selected strains as compared to the check on Mr. McKeary's farm, was the smallest of any of the seven. This is accounted for by the fact that Mr. McKeary had practiced mass hill selection for several years prior to the initial hill-unit selection. The exceptionally large increase on Mr. Pagels' plot was probably due to the fact

that Mr. Pagels planted "just potatoes" year after year, never paying any attention to the quality of the seed he used. It is but natural in this instance that selected hills should show such a marked increase over the check.

While the quantity of data presented is rather limited, yet it is quite consistent. This year we have nineteen of these plots under way in various parts of New York State. We plan to have from fifteen to twenty potato hill-unit selection plots each year. Each year as the work is completed on the various plots, more data will become available from which definite conclusions may be drawn.

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## SOME OF THE CAUSES OF POOR STANDS

H. R. Talmage, Riverhead, N. Y.

Along the Atlantic Seaboard, where applications of a ton or more of high grade fertilizer per acre are used, the most common cause of poor stands is due to the fertilizer coming in contact with the seed.

John Coleski is a Polish farmer who has a very good potato farm but he uses too much "Home Brew" and last spring it was rather late when he started to plant his potatoes. Because of his habits he is usually under foot financially and has to buy his seed and fertilizer from a dealer who makes special arrangements to carry him. After it was time for the potatoes to be up he called on his dealer and told him that the seed was no good and had come up very poorly. There were five different sources of seed that he used and all showed a poor stand. The dealer went up and looked over the situation. He found that the first potatoes planted came up pretty good. As the planting continued the stands

on the later plantings were poorer. The planter used did not mix the fertilizer well through the soil and the earlier planted fields, planted when the ground was wet, came up much better than the part of the crop planted later when the ground was much drier and warmer. The same seed, when planted by other farmers, where the fertilizer and seed did not come in contact, came up well. The writer could name many such instances that have come under his personal observation this season.

The complaint of poor stand was very much more general than usual last spring, due to the hot, dry weather at the time of planting. Such conditions always cause much trouble of that nature. While in Maine this summer we saw a field planted with two planters working together. On August first, while the stand was good after both planters, the potatoes put in by one planter were at least 50 per cent larger than those put in by the other. Both were picker planters and the difference was caused by the fertilizer coming too close to the seed after one of them. If manufacturers of some of the makes of planters now on the market do not arrange them so that the fertilizer will not come in contact with the seed, they are going to lose the sale of many machines. On one of my farms we have been using a planter for two years that does not keep the fertilizer far enough away from the seed. Next spring we will discard this planter and get one that is right in this respect.

A second very common cause for poor stand in potato fields, is due to seed infected with late blight. I have seen many fields this past summer in which a large proportion, sometimes nearly 50 per cent, of the hills were missing because of seed that was infected with late blight. Although care was used in cutting and apparently only sound seed put into the ground, the infection was there and under the conditions in the soil of the potato field, many of the pieces decayed. Many of the plants came up spindling and upon investigation the seed piece was found decayed. Many of these spindling plants later improved and made a fairly good yield.

Two years ago about a barrel of the sound ends from tubers that had started to decay with late blight were planted by themselves. Although the pieces planted were apparently sound, but few of them sent up sprouts above the ground and most of those were spindling.

Rhizoctonia is another common cause for poor stands. With us here on Long Island, even though the first sprouts may be rotted off, usually later sprouts come along and those hills will make a fair yield. It seems that in our climate, it is only very early in the season that rhizoctonia does any injury to our potatoes.

Still another cause of poor stand in potato fields is due to allowing the seed to be exposed to the air and dry out.

We find that with proper care it is rare that we now have much difficulty with poor stand in our potato fields.

# THE POTATO NEWS BULLETIN

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

AT WASHINGTON, D. C.



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"Entered as second-class matter May 31, 1924, at the post office at Washington, D. C., under the Act of March 3, 1879."

SUBSCRIPTION PRICE $1.00 PER YEAR


## FERTILIZER NUMBER

The December issue which is going to be chiefly devoted to fertilizing the potato crop promises to be the best number of the season. Unquestionably the December number will be used much for reference on the subject mentioned.

## A SPECIAL TRAIN LOAD OF CERTIFIED SEED POTATOES


**A. G. Tolaas, Univ. of Minn., St. Paul, Minn.**


On October 18, a special Rock Island train loaded with Hollandale products left Clarks Grove for St. Louis, Missouri. The trainload, consisting of 21 cars of certified Irish Cobblers, 11 cars of Russet Burbanks, 3 cars of onions and 1 car of carrots was sold to the Hollmann Produce Company of St. Louis by the Hollandale Cooperative Marketing Association. As originally planned the train should have contained 26 cars of certified Cobblers, but owing to the unfavorable weather conditions it was impossible to fill the complete order. The special train was made possible by the efforts of Prof. Earl M. Page, Extension Horticulturist of the Missouri Experiment Station.

Mr. Page has been very instrumental in getting the Missouri farmers interested in certified seed potatoes, and has carried on numerous certified seed test plots, the results of which have shown the value of such seed stock. The potatoes sold in this train are to be planted in the vicinity of St. Charles, Spanish Lake, Chesterfield and Anglum, Missouri.

Mr. P. N. Davis, manager of the Hollandale Cooperative Marketing Association and supervisor of the potato project at Hollandale, had direct charge of loading the shipment. Mr. Davis is an advocate of high quality and it is largely through his efforts that there is such a large demand for Hollandale potatoes. Every sack of certified stock contains the Hollandale Brand and three inspectors of the State Department were kept busy inspecting every truckload of potatoes that was put into this special train.

The Hollmann Produce Company of St. Louis, Missouri, were first convinced by Mr. Davis three years ago that real quality potatoes, properly sacked and graded only would be allowed to leave Hollandole in branded sacks. Three years ago Mr. Davis sold this concern three cars of certified seed potatoes. This year the Hollmann Produce Company is buying over 300 carloads of Hollandale produce, mostly certified seed potatoes. That the Hollmann Produce Company is convinced of the excellent quality of certified seed produced at Hollandale is evidenced by the fact that it has built a potato storage house for the storing of certified seed only, 208 feet long by 42 feet wide, capable of holding 50 to 60 carloads of potatoes. This storage house is modern in every respect, especial emphasis being placed on proper insulation and ventilation. The Hollmann Produce Company is now the official distributing agency for Hollandale Brand certified seed in St. Louis.

With regard to running the special train, the best of cooperation was furnished by the Rock Island and Wabash Railroads. An attractive poster containing information relative to all the agencies interested in the event was prepared by the latter railroad and posted in every town along its route. The train arrived at St. Charles less than two days after leaving Clarks Grove. At St. Charles the cars destined for that place were dropped and the train then proceeded to Anglum, where a big potato meeting was held to celebrate the event. More than one hundred farmers to whom the seed was sold at that place were on hand. Talks were given by Prof. Page, Mr. Myer, Extension Director at the Missouri Experiment Station, Mr. Hanson, County agricultural Agent of St. Louis County, Mr. Hollmann, Mr. Hopkins, assistant general freight agent of the Wabash Railroad and others, including the writer who was personally invited to accompany the train by Mr. Charles Metcalf of the Hollmann Produce Company.

Still and moving pictures were taken as the train left Clarks Grove. Altogether this notable event was a real example of true cooperation, and a forerunner of what might be accomplished in the distribution of certified seed potatoes.

**Daniel Dean** **Bell Phone**

**RIVERDALE FARMS**
**POTATOES**
**Seed Oats Seed Corn**
Nichols, Tioga County, N. Y.

November 11, 1925

Mr. W. M. Peacock,

Dear Mr. Peacock:

Enclosed find a short article. Regret that I could not do more, but the rush of digging over 9,000 bushels before frost injury has been a hard one. I took a line which I guessed might be a good one for an issue ahead of the annual meeting, to stimulate thought. Hope to run down to Washington on business this month, but whether I can dare to leave the crop for a trip as long as that to Kansas City, Mo. is a question. I am mindful of Andrew Carnegie's injunction to watch the basket.

Your friend,

**Daniel Dean**

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## FUTURE POSSIBILITIES WITH THE POTATO

**Daniel Dean, Nichols, New York**

The question of what directions the development of American potato production and marketing will take is a vital one for the grower, the dealer and the scientist. To the grower it may mean a fortune, small compared with those of the city world, but a welcome change from the losses of the last few years. To the scientist, success in forecasting the lines of future development upon which scientific research will be most in demand means a reputation, demand for his services, and quick promotion to better paid positions.

Few appreciate how rapid and how great has been the progress of the potato industry in the past seventy-five years. From a local production upon little more than a garden scale for local needs it has grown to be a great industry, more and more specialized to limited areas. Since the first experiment stations were organized the demand by the potato grower for scientific guidance has steadily increased. At first, the testing of potato varieties, of crop rotations and of field practices had to be attended to. Some such lines of study have been practically exhausted. Such is the case with experiments on the size of seed pieces, and on the spacing of hills in the row. Variety testing is now a thing of the past, and in its place we now have a thorough testing of individual strains by skilled plant pathologists for small percentages of dangerous diseases. Once the Colorado potato beetle was a dreaded pest. Even now the late blight and rot is feared in many sections. Both

are easy of control when the best scientific knowledge of the disease or the insect, and of the spray materials needed for control is joined with use of the best up-to-date spray machinery and the technic for its use. On the economic side, it is but a few years since the city dealer had to know that the buying of every car of potatoes was a new adventure, which might lead to the most unexpected results when he inspected his purchase. Now standardization has reached a point where the dealer can buy with the reasonable cartainty of knowing what he is going to receive

Forecasting the future is a perilous occupation. Who could have dreamed thirty years ago of the place the automobile, the movie, the radio and the Florida land boom would hold in America to-day? Or who could have dreamed of the tens of thousands of carloads of potatoes Aroostook county is now shipping each year, of carloads from Idaho to New York, or from Michigan to California to relieve shortage?

It may be that some one will revolutionize the potato industry by breeding a new variety which shall combine the heat resistance of the McCormick with the appearance and table quality of our present standard varieties, now limited to northern climates by their inability to stand extreme heat. Such a new variety would move the center of gravity of the potato production from the far north to the Corn Belt and the south. In the past great efforts have been made to breed new varieties which possess resistance to some potato trouble, the late blight and rot, common scab, the wart disease, and even the potato bug. The writer feels that so few varieties out of the millions that have been bred possess sufficient vigor, good appearance, and fine table quality. To attempt to find additional varieties which shall possess these desirable qualities, and in addition the ability to resist one or perhaps more than one enemy besides is to chance the loss of the present desirable qualities. Science can be relied upon to guard by spraying, seed disinfection and plant quarantines against these troubles. It is fortunate for America that we have not been forced, as Europe has, to discard our varieties best suited for economic potato production in order to find others which can be grown in soil infected with the wart disease. It is interesting to figure what would be the increase of the price of potatoes to the consumer for every one of the next fifty years if we had to discard our most widely grown group of varieties, the Rural, because of the importation of wart disease from Europe.

Perhaps our greatest need to-day is for better knowledge of the potato under storage conditions. Compare the volume of work done in study of the potato during the few months of its growth in the field, with that one the longer period in which the tuber is in storage, but all the time exposed to many and varied dangers. Very fine research has been made upon the potato in storage, in quantities small enough for laboratory use. As yet, practically nothing scientific has been attempted in the study of commercial

quantities of potatoes in storage. Growers and dealers possess a mass of experience in handling large masses of potatoes in storage, but this knowledge is of little value till it is collected, classified and studied in the light of scientific present knowledge. Then the laboratory work of the scientist and the commercial scale experience of the grower and dealer can be made the foundation for a plan of research for potato storage problems in scale to those now in use in the potato field.

More than half of our potato crop is stored each year. Seed alone takes close to one tenth of the total yield, when its shrinkage from fall to spring or next June is remembered. On the farm and in the city, including the use of potatoes as seed, a quantity of potato is used each season far greater than the amount shipped as carloads in April, May and June, at a period when sprouting and shrinkage is heaviest, and when loss of seed vitality is greatest. A large part, if not the greater part of the potatoes planted as seed each season have been reduced in vitality by sprouting. We need to know more of methods for holding seed dormant till time of planting.

What may be the effect of storage conditions upon the development of seed carried diseases the following season? The relation of alkaline soil to common scab, of humid weather to epidemics of late blight and rot are well known. Can it be possible that any relation may exist between unfavorable storage conditions and later outbreaks of degenerative diseases as leaf-roll and spindle-sprout, considering the latter as a disease?

With the human race progress in medical science has been able to lengthen the average span of life by several years. Though plant pathology has made immense strides in the past few years, I venture to predict that future progress with the potato will be even greater, and that it may take new directions not yet considered.

Individual growers like the writer have had success in control of unfavorable market factors in the sale of the potato tuber. Hollow-heart, second-growth, off-shapes and unsuitable sizes are all detrimental to high prices, and may in the future be given scientific study with advantage.

Last of all, the possibilities of better utilization of the potato crop in years of shortage or overproduction are fast being appreciated, with prospects of even better control than in the past.

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## CO-OPERATION IN CERTIFIED SEED PRODUCTION

**Walter M. Peacock**

During the year of 1925 the Ott Certified Seed Club was organized at Bridgeton, N. J. It has made a good start and is forging ahead. The principles of the club are ideal and the writer sees

no reason why the club should not continue to grow under proper management.

This year 22 farmers were members of the club and grew the Ott's strain of the Irish Cobbler variety of potatoes. After seeing the mutual benefits to be derived by being members of the club several other growers have joined this organization. Therefore the number of farmers growing the Ott's strain of Irish Cobblers in southern New Jersey will be larger next year.

The benefits to be derived by being a member of this club are obvious after learning that the seed potatoes for the club members are all to be grown on the Ott farm. In other words seed potatoes will be grown on this farm for all members of the club. The farm will be one large seed plot. This will afford a prospective buyer an opportunity to purchase several carloads of well-selected certified Irish Cobbler seed potatoes of one strain in a radius of a few miles. An insurance of this kind should be a great value to both the small and large buyers of certified seed potatoes.

For several years, Frank L. Ott, in co-operation with Dr. Wm. H. Martin and other investigators, have been conducting experiments to improve the Ott strain of Irish Cobblers. Plans are being made to conduct seed improvement experiments on a larger and more intensive scale on the Ott farm in the future.

It may be of interest to several of the readers to learn that the Ott's strain of Irish Cobblers has been grown in southern New Jersey for many years, and it is now freer from disease and more productive than when it was first introduced by Mr. Ott. Furthermore, it has compared favorably with the best strains grown in this country and Canada in strain tests wherever conducted.

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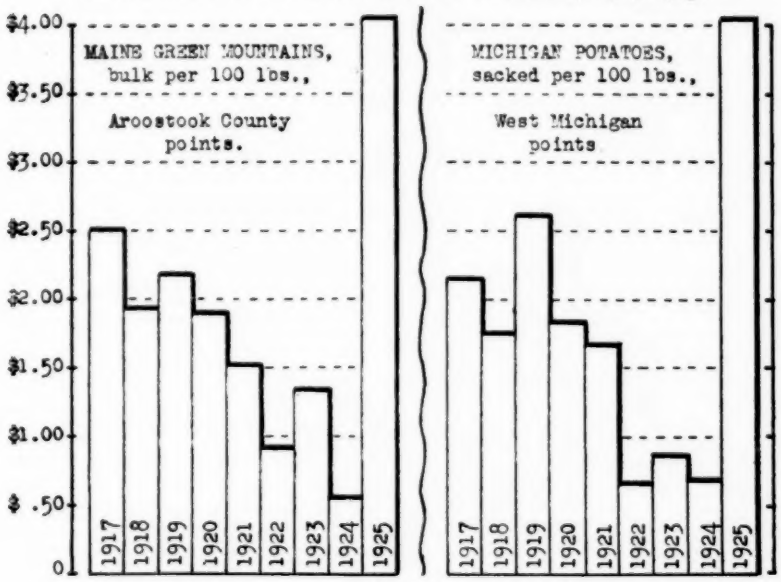
## POTATO PRICES REACH HIGH LEVELS

### (Contribution from the Fruit and Vegetable Division, Bureau of Agricultural Economics, U. S. Department of Agriculture)

Two startling things occurred in potatoes during the past six weeks: (1) the sharp rise in prices, and (2) the increase of 2,300,000 bushels in the November crop report. Knowledge of the light crop, aided by rumors of rot and frost damage, caused a rising tide of prices which swept everything before it, — until the market broke about November 1. During the month of October prices doubled. In early October, bulk Maine Green Mountains were jobbing on the New York market at $2.20-$2.35 per 100 pounds, and carlot sales of sacked Northern Round Whites ruled around $1.75 in Chicago. Corresponding prices by the end of the month were $4.30-$4.45 and $4.15 $4.25, respectively. F. o. b. sales in northern Maine, western New York and the North Central region ranged $1.75 $2.00 at the opening of October, but by November the range was $4.00-$4.15 per 100 pounds.

Some shipping sections reported great excitement, as prices advanced day by day. The speculative mood was strong. Winter weather conditions and car shortage restricted movement in a few states. A heavy freeze occurred in northern Colorado and caught about half the late crop still in the ground. Compared with the past 8 years, shipping-point prices have been exceptionally high, as shown in the accompanying chart. Even during fall months of the war period and following the light crop of 1919, country dealers and shippers were getting from $1.50-$2.25 per 100 pounds less than during the first week of November this season. Recent f. o. b. prices in Maine and Michigan have been nearly $3.50 above the extremely low levels of last November. A newspaper report states that one grower in southern Idaho sold his crop of 8,000 bushels of potatoes for $24,000, and similar reports of high returns to growers have been received from other sections.

F.O.B. PRICES OF POTATOES AROUND NOVEMBER 2, 1917-1925:




BUT — by the first week of November, prices began to come down; not quite so fast as the stick from a sky-rocket, but they were coming down, nevertheless. Price levels apparently went a little too high, and dealers hesitated to buy. Uncertainty regarding the frost damage and doubt concerning the November crop report also tended to stop the upward swing of the market. Chicago carlot sales reached their highest point on October 31, when sacked Northern Round Whites ranged $4.15-$4.25 per 100 pounds, and the New York jobbing market touched its highest level on Novem-

ber 2, with top price of $4.50 on New York Round Whites, $4.70 on bulk Maine Green Mountains, and $4.85 on Long Island Green Mountains. The line representing average prices in Chicago showed an exceptionally sharp bulge between October 29 and November 4, the price having fluctuated 80 cents within three days' time. After dropping to $3.50-$3.65 on November 4, there was a slight recovery the next two days, followed by another decline. On November 7, Chicago's range of $3.70-$3.80 for sacked Round Whites compared with the New York City range of $4.00-$4.30 on bulk Maine Green Mountains. Chicago dealers were asking $5.00-$5.25 for Idaho Russets at the opening of the month, and only $4.25 a week later, with practically no sales reported. Texas carlot markets ranged $4.00-$4.25 per 100 pounds on Idaho Rurals and on Colorado stock. Light supplies in some eastern markets caused a slight rise in prices, but the situation later weakened. Chicago's supplies were heavy, with 465 cars on track on November 7. In spite of the declines, city wholesale prices still were three or four times last season's corresponding ranges. The sharply upward trend of October was in decided contrast to the relatively steady markets and low prices of a year ago. The firm undertone indicates that spring sales may show an advance over the present levels, but just how high the market will go no one knows.

Early November reports from principal shipping sections indicate a standstill. Mr. Spud apparently has stopped to catch his breath, after his rapid climb. Many growers were unwilling to sell at the lower prices which prevailed after the peak point had been passed, and dealers were holding off. Declines of 25 cents to 50 cents per 100 pounds reduced the Maine and western New York f. o. b. quotations to a range of $3.60-$3.85; North Central potatoes sold generally at $3.35-$3.50, with top of $3.75 in Michigan, and the southern Idaho price was $3.00-$3.25 for California-pack Russets. Growers in Colorado and Nebraska were receiving $3.00-$3.25 per 100 pounds about November 7. A year ago, the general f. o. b. market on potatoes was 50 cents to $1.00. Shipments during the first week of November filled 6,440 cars, — about 400 less than the preceding week but 900 more than during the same period last season. Maine led with 1,100 cars, while Idaho and Minnesota shipped 750 and 800 each. To that time, the season's total movement from Maine, Long Island, Pennsylvania, the North Central region (except South Dakota and Minnesota), and all of the leading western potato states was running far ahead of the record to the same date in 1924. Western New York and other important late-potato states were falling below last year's record.

In spite of a short crop, Canadian shippers have been sending some of their light surplus to the United States. Prices have been so high that the tariff of 50 cents per 100 pounds has not been a serious barrier. The opening week of November saw 300 cars arrive from Canada, and total receipts of Canadian potatoes this season have been about twenty times those of the early part of

last season. Considerable pressure has been brought to bear on the Federal Horticultural Board to permit the entry of potatoes from European countries, but there is no indication that the ban will be lifted.

It was a great surprise in most quarters, when the November estimate showed an increase over the October forecast. The Crop Reporting Board explained the situation as follows: "The production of potatoes is still somewhat uncertain, because part of the crop was still in the ground on November 1 and losses from freezing could not be accurately estimated. In New York there has been heavy loss from rotting, and in most of the late potato states there has been considerable loss from freezing. As a result of blight, freezing, and dry weather, the average quality is below that of any year since 1921. On the other hand, a number of states, such as Pennsylvania, Ohio, and Idaho, show surprisingly heavy yields per acre, so that for the country as a whole the average yield per acre is nearly up to the average of the last 10 years." It may be added that growers in Idaho report potatoes of large size this year, and some of the North Central States advise that quality of most stock is very good.

The exact reported net increase in production over the October forecast is 2,276,000 bushels. It is worthy of special note, however, that the total increase of approximately 9,500,000 bushels is chiefly in Ohio, Pennsylvania, New Jersey, Connecticut, Minnesota, Idaho and Washington. More than one-third of this total gain over the October report is in Ohio and Connecticut, which are negligible factors so far as shipments are concerned, and in New Jersey, which is practically through shipping. Another third of the increase is in less important states that do not ship heavily or that are through shipping. The gain of about 3,000,000 bushels in Pennsylvania, Minnesota, Idaho and Washington combined is the only thing which greatly concerns shippers of late potatoes. To offset the 3,000,000 increase in those four states is the reported decrease of 3,300,000 bushels in New York, 950,000 in North Dakota, 667,000 in California, 582,000 in Colorado, and 384,000 in South Dakota. The combined decrease in these five states is about 6,000,000 bushels, so that, in all the important late states together, there really has been a net decrease instead of a gain since October 1. The total United States crop, — early, intermediate and late sections, — is now estimated at 346,503,000 bushels, compared with 454,784,000 last year. Average yield per acre in Maine is figured at 242 bushels, compared with the high average of 305 last season. New York crop seems to be running about 87 bushels to the acre, as against 140 in 1924. The North Central States are averaging from 20 to 35 bushels less per acre than last year, while Colorado and the Pacific Northwest is turning out a much heavier yield than that of the 1924 season.

The truest picture of the entire situation, however, is seen in a comparison of the production figures, grouped by States as follows:

| Group | Forecast Oct., 1925 | Estimated Nov., 1925 | Estimated Dec., 1924 |
|---|---|---|---|
| | bushels | bushels | bushels |
| *19 surplus-producing late States ..... | 240,760,000 | 238,154,000 | 308,556,000 |
| **16 deficient-producing late States ..... | 77,598,000 | 81,897,000 | 113,388,000 |
| Total in 35 late States | 318,358,000 | 320,051,000 | 421,944,000 |
| 13 early or intermediate States ..... | 25,869,000 | 26,452,000 | 32,840,000 |
| Total United States .. | 344,227,000 | 346,503,000 | 454,784,000 |

* Maine, Vermont, New York, Pennsylvania, Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Montana, Wyoming, Colorado, Utah, Nevada, Idaho, Washington, Oregon, California.

** New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, W. Virginia, Ohio, Indiana, Illinois, Iowa, Missouri, Kansas, Kentucky.

Compared with the October forecast, the table shows a decrease of 2,606,000 bushels in the 19 surplus-producing late states and an increase of 4,299,000 bushels in the 16 deficient-producing late states, making the November estimate represent a net increase of 1,693,000 bushels of potatoes in all the late states. There is also an increase of 583,000 in the early and intermediate states. Compared with the 1924 crop, the November estimate shows a decrease of 70,402,000 bushels in the 19 surplus late states, a decrease of 31,491,000 bushels in the 16 deficient states, making a total decrease of 101,893,000 bushels in all the late states. The early and intermediate states show 6,388,000 bushels less than last year.

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# POTATO NOTES

**Colorado.**—In the October issue of the Potato News Bulletin it was stated that the 1925 crop of the Greeley District would be about 1000 cars less than the 1924 crop. This was an error as it should have read about 100 cars less for the 1925 crop. The crops grown for the two years are about the same, but owing to rains, snow and

freezing of the ground about 50 per cent, or 2000 cars remain unharvested at the present time. It is very doubtful at this time as to how much of the undug crop will be harvested or what percentage will be injured by frost. However, at the present time, it is thought that possibly 30 per cent of the potatoes remaining in the ground cannot go to market if the remaining crop is harvested.

Some growers are digging with the diggers, others are practicing hand digging, while other growers are waiting for more favorable conditions for harvest. Harvesting in other portions of the state is about completed. Yields have been a little larger than previously expected and the quality of the crop throughout the state is above normal.

Mr. W. H. Olin, Supt., of Agriculture for the Denver & Rio Grande Railway, informs the writer that the San Luis crop was about 1000 cars more than the early estimate, placing the carlot shipment for the San Luis Valley at about 5500 cars. The market is strong and dealers are paying $3.00 per cwt. at the present time. **—W. C. Edmundson. October 31.**

**Connecticut.**—All indications point to a comparatively small potato crop in Connecticut this year, probably not over 70 per cent of the 1924 production. The reasons for this are rather obscure in many instances, but in general, can be attributed to the following: (1) A decrease in acreage planted; (2) A dry June, which interferred with the set and growth of early potatoes; (3) An early and heavy infestation of insects, especially leaf hoppers and flea beetles; (4) A wet July, which favored the spread of late blight; (5) A very dry August, the month in which the Connecticut late crop makes about 50 per cent of its growth. The dry August, although undoubtedly decreasing the yields of Green Mountains, may not have been as disastrous as a wet month would have been, due to the general infection of late blight at the beginning of that month. However, the weather conditions during both August and September have been conducive to the production of a crop of medium sized, clean potatoes, and most of it has been harvested in good condition at this date (October 26). The average price is about $2.00 per bushel for No. 1's.**—A. B. Brown, Oct. 26.**

**Kentucky.**—On the night of October 19th, the first frost to injury potatoes struck Jefferson County. While not enough damage was done to stop growth, I think that the frost that seemed inevitable last night, October 20th, will complete the job.

The average yield for the certified crop will be about seven or eight bushels per bushel planted. The yield of common stock in some cases would have been so low that the ground was prepared and sowed in rye a month ago. The certified stock is finer than any we have ever produced, a remarkably low count of mosaic and leaf roll being found, but a somewhat higher count of spindle tuber. **—John S. Gardner, October 21.**

**Nebraska.**—It is generally acknowledged that the crop of potatoes in western Nebraska, both seed stock and table stock is of

better quality than normally is the case. In the irrigated regions the yield is above normal. In the dry land districts the yields have been satisfactory, being very high in some cases and with practically no low yields. The digging season has been very unsatisfactory. However, probably most of the crop was safely under cover before the recent spell of very severe weather. A few growers still have a large acreage undug, but from reports it appears that this is probably less than 5 per cent.

The prices have been rising very rapidly during the last 10 days, the market on commercial stock having gone up to $3.10 to $3.40 per cwt. and certified seed orders being booked at $4.00 per cwt.

The certified seed production is estimated at about 200 cars. About 80 per cent of the crop of certified seed has been sold. The sales have been made to buyers from Texas, Utah, Minnesota, Alabama, Georgia and Louisiana. In comparison with former years only a small quantity has been shipped to the latter state. The situation with regard to Fusarium eumartii in certain seems to be better than was previously reported.

This report is principally based upon information received from Wm. Morrow, Alliance; J. M. Tollman, Marsland and Eugene Bellinger, Morrill.—**H. O. Werner. November 2.**

**New York.**—New York is one of several important potato states whose estimated production for 1925 showed a decline under the October estimate. This decline was due, first of all, to the disappointing yields resulting from poor stands and very general injury and premature ripening of the crop due to hopper burn. The second important cause of this decline is the general occurrence of blight rot throughout central and western New York. Average yields for the state this year will be considerably below normal, probably less than ninety bushels. The crop in northern New York was comparatively free from hopper burn and blight rot. However, the average yields will be considerably below normal in this section. The blanket of snow which covered the unharvested crop during the freezing temperatures of middle October prevented any appreciable damage from freezing of the tubers. The Long Island crop, although below normal in yield, has been of excellent quality and sold for prices very satisfactory to the grower. As late as October 25th, probably forty per cent of the potato acreage in western New York was still unharvested. Weather conditions have been so unfavorable throughout October as to hold back harvesting operations not only in potatoes but beans and other crops. Many fields in western New York will not be harvested because of poor yields and lack of opportunity to harvest. Blight rot ranging from twenty-five to fifty per cent of the tubers is reported for this section. As late as November 1st growers in central and western New York are receiving from $2.00 to $2.25 per bushel, the demand for potatoes being very acute. Growers are inclined to store as much as facilities will permit, looking toward $3.00 potatoes in the spring.

# IRON AGE

## Modern Potato Machinery

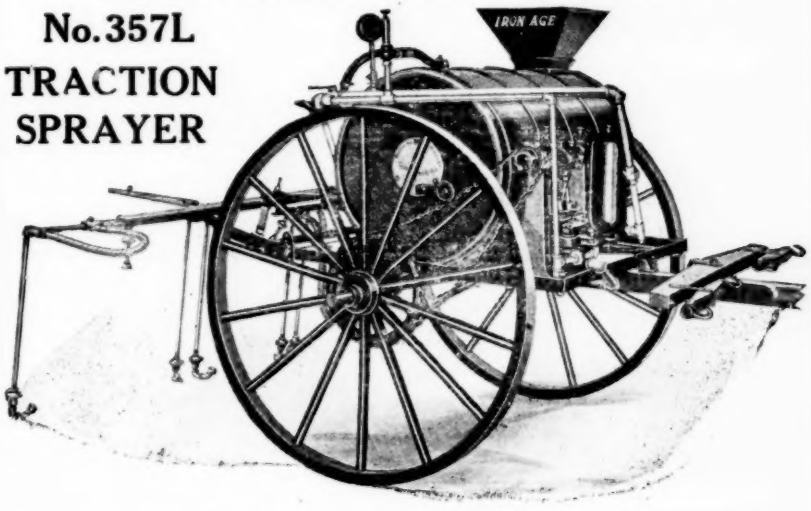
**The Latest Approved after many years of Practical Experience**

IRON AGE HIGH PRESSURE TRACTION SPRAYERS

**Protect Your Crop.** **Insure Your Profit.**

**The No. 357L Traction Sprayer** shown here has all the strong **IRON AGE** features, the new **Triplex Pump,** the new **IRON AGE Pressure Retainer** and **Pump Relief,** 100 gallon cylindrical tank.

**No. 357L TRACTION SPRAYER**




As shown here it is equipped with the celebrated twelve-nozzle Drop Bar for spraying four rows. This may be replaced with the regular eight-row Bar.

### The Assisted Feed Potato Planter

known as the 100 per cent Planter, is unequaled for absolute accuracy in planting.

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Traction or Engine-driven, have wide elevator, are easy-running and give thorough separation.

**Write for catalogues describing these machines, also Garden Tools, Horse Hoes and Cultivators, etc.**

## Fred H. Bateman Company

624 South Washington Sq., Philadelphia, Penna.

Green Mountain certified seed has sold readily, while even Rural certified seed, which usually is not sold until spring, is having an active market at the present time.—**E. V. Hardenburg.**

**Ontario.**—The demand for certified seed potatoes from the north is exceptionally good this fall. Many purchasers however, delayed placing orders until this week so it is not likely that many cars will move now as cold weather is setting in.

### Thunder Bay District

Certified seed was offered here two weeks ago at $1.60 per 90 pound bag, f. o. b. shipping point. Orders were very slow coming in at that price but offerings have been snapped up this week at $1.80 per bag. The average yield is excellent and the stock is for the most part very clean. A small percentage late blight rot is reported on a few farms. Some net necrosis was noted in one locality.

### Rainy River District

Certified seed yields were excellent, the tubers are larger in size and somewhat rough with slightly more scab than usual. Wet weather delayed the harvesting. Cold weather set in early and considerable acreage has been left frozen in the ground, which will reduce this district's output by many cars. Crop all sold at $1.80 per 90 pound bag f. o. b. shipping point.

### Sudbury District

Frost in early August has, according to some growers, reduced the crop to the lowest yields in the last 30 years. The certified seed here is an excellent sample but the run is small. It is quoted at from $2.50 to $3.00 per 90 pound bag f. o. b. shipping point.

### Wellington County

Demand for certified seed is excellent this fall. Yields are very satisfactory for the most part with the certified seed growers, quality is above the average. A small percentage of late blight rot showing in a few bins. Bulk of crop will likely be held until spring some are selling half the crop this fall and holding the balance. Some sales have been made at around $2.00 per bag for spring delivery but few orders are being accepted at that price. Wellington County is a coming certified seed producing center, has excellent potato soil, high altitude and good potato growers.—**J. Tucker, Oct. 30.**

**Pennsylvania.**—The Pensylvania potato crop is reported by the State Department of Agriculture on Oct. 1st, as 82 per cent of normal or practically the same as last year but about 7 per cent above the ten year average. Extremely dry weather in August killed the best fields in most of the state and reduced the yields very materially. Well sprayed and tended fields which would have made 300 to 400 bushels were cut to 250 or less in most cases. A few sections, such as Lehigh County, had more rain and have harvested good crops. Almost all potatoes are out of the ground

except some delayed by recent wet weather. The price to the farmer started around $1.00 and has been advancing rapidly during October, some buyers now offering $1.60 per bushel or better. Most of the crop has gone on the market in spite of the prospects of better prices.

The quality of the crop is generally excellent. Practically no oversize tubers and in good fields few seconds. Wilt and stem rot seem negligible and blight and blight rot did no damage. Rhizoctonia on the tubers seems unusually prevalent.—**J. B. R. Dickey, November 3.**

**South Dakota.**—The quality of South Dakota potatoes this year is fully as good as those of 1924. The size will run smaller and the yield per acre lower but these two factors are not considered of so great importance in the production of seed potatoes. Practically all of the certified Irish Cobblers from South Dakota this year have been sold to Virginia growers. Prices have ranged from $1.25 to $1.50 per bushel sacked and graded f. o. b.

Many growers in the seed potato producing sections this year used the hot formaldehyde treatment of seed. From appearances at present, this treatment does not seem to control rhizoctonia as thoroughly as the Corrosive Sublimate treatment with soft water. During recent years, Corrosive Sublimate has been used to a large extent in attempting to control this disease but it is very evident that the effectiveness of Corrosive Sublimate was considerably reduced when put in solution with some of the waters used. Laboratory tests proved that from 28 to 67 per cent of the Corrosive Sublimate was lost. This is in accord of course, with similar work having been done in other states.

The demand for table stock seems to be increasing each week as prices during the last month have advanced to such a degree that the growers who sold options on their crops early are now realizing as much as those who are selling later.

The South Dakota Potato Growers Association will not have their state annual show and convention until January. This will be held in connection with the meeting of the South Dakota Crop Improvement Association to be held at Aberdeen.

One of the main projects which the South Dakota Potato Growers Association worked on last year in cooperation with the Extension Service of State College of Agriculture, consisted of sending samples to southern states for trial. About fifty samples were sent and reports are now fairly complete regarding the performance of South Dakota seed in these trials. It is very evident that the germination of some samples was effected by freezing while in transit as stands were very poor in some instances. The Association intends to continue this project another year and cooperate with any southern State Experiment Station conducting such trials. The Association will also cooperate with any County Farm Bureau desiring to conduct such trials of seed potatoes.—**Geo. H. Valentine, October 28.**

# POTATO MEETINGS

Nov. 17-20, 1925—Maine Seed Potato Show will be held at Portland, Maine.

Nov. 17-20, 1925—Pacific Northwest Potato Show at Spokane, Washington.

Nov. 25-28, 1925—The Fourth Annual British Columbia Potato Show will be held at New Westminster, B. C.

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## POTATO DISEASE CONFERENCE AT LINCOLN, NEBRASKA

The potato degeneration disease conference at the Nebraska College of Agriculture, at Lincoln, will be held on the date previously announced, i. e. Monday, December 28th, just preceding the meetings of the American Phytopathological Society and the Potato Association of America which will be held at Kansas City, Mo. This conference will afford a splendid opportunity to study all of the important degeneration or virus disases of potatoes now recognized in North America. These will be shown in a number of varieties grown under uniform controlled conditions, planned to either mask or accentuate the symptoms of the various diseases.

Up until the present date (Oct. 14) 143 distinct samples of diseased seed stock have been received. These represent 16 distinctly named virus diseases, not counting combinations of the various diseases, as well as a few "unknowns." These diseases are on one or more of 15 distinct varieties. Material has been received from 14 different states, i. e. practically all of the important northern potato producing states. One planting of the above material has been made. By the date of the conference these should be well developed plants. For the purpose of showing the disease symptoms on smaller or younger plants another set will be started early in November.

While the symptoms on greenhouse grown plants are not always the same as on outdoor plants, for critical study the greenhouse method is the most satisfactory because of the possibility of controlling soil and atmospheric conditions.

The conference will be attended by pathologists, horticulturists, seed certification inspectors and plant physiologists from practically all of the important, and some of the minor, potato producing states.

It appears that this will be the first time when such a complete collection of potato degeneration disease material has been assembled at one place. It will also probably be the first time when workers vitally interested in these diseases have an opportunity to get together and discuss them, with the actual plants under comparable conditions.

**McCABE BROTHERS**

GROWERS AND SHIPPERS

RED RIVER CERTIFIED SEED POTATOES

SABIN, MINNESOTA

In order that all those who are interested will be properly supplied with any advance information that may be sent out, it is requested that they communicate with Dr. G. L. Peltier at an early date unless they have already done so. This is not mandatory but desirable.—**H. O. Werner, Oct. 14.**

## THE TWELFTH ANNUAL MEETING

The twelfth annual meeting of The Potato Association of America will be held at Kansas City, Mo., December 29-31. We have not been advised as yet by the local chairman of the American Association for the Advancement of Science as to the building and room assigned to the Association for the holding of its meetings. It is hoped that this announcement can be made in the December issue of the News Bulletin. Your attention is invited to the excellent list of papers secured by the program committee. The sessions devoted to a discussion of Seed Certification, Seed Potato Disinfection, and the joint session with the members of the Phytopathology Society which will be wholly devoted to a discussion of potato diseases with special emphasis on virus troubles should be of interest to every member. Thursday's program will deal with papers of general interest to the grower. Altogether it is believed that the tentative program submitted below is one of the best yet offered by the Association and it is hoped that it will prove a sufficient inducement to many members to attend the meeting.

In order to secure a one-half return trip fare it is necessary when purchasing your ticket to Kansas City to request your local agent to furnish you with a certificate stating you are attending the meetings of the American Association for the Advancement of Science of which our organization is an associate member.

The list of Kansas City hotels with location and rates per day for single and double rooms with and without bath which is published below was furnished by the Secretary of the A. A. A. S. for the convenience of those planning to attend these meetings.

The executive committee of The Potato Association of America respectfully urge you to attend this meeting and by your presence help to make it the most helpful one yet held. A cordial invitation is also extended to all persons who are not members of our Association but who are interested in some phase of the potato industry to meet with us and enjoy the excellent progam.-**W. Stuart, Secretary-Treasurer.**

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## TENTATIVE PROGRAM

### Tuesday A. M., December 29, 1925

Introductory remarks by the President, H. O. Werner, Lincoln, Nebraska.

Report of the Secretary-Treasurer, Wm. Stuart, Washington, D. C.

Report of the Editor & Business Mgr. of The Potato News Bulletin, W. M. Peacock, Washington, D. C.

Reports of Committees —

Research—R. W. Goss, General Chairman, Lincoln, Nebr.

Subcommittees and Chairmen—

A. Physiological Investigations, C. O. Appleman, College Park, Maryland.

B. Pathological Investigations, R. W. Goss, Lincoln, Nebr.

C. Genetics and Seed Improvement, Fred Krantz, St. Paul, Minnesota.

D. Soils and Cultural Investigations, E. V. Hardenburg, Ithaca, N. Y.

Variety Nomenclature and Variety and Strain Testing, H. C. Moore, Chairman, East Lansing, Michigan.

Potato Marketing, Daniel Dean, Chairman, Nichols, N. Y.

Membership, Wm. Stuart, Chairman, Washington, D. C.

Seed Potato Certification, W. H. Martin, Chairman, New Brunswick, New Jersey.

### Tuesday P. M., December 29, 1925 Seed Certification Session

The Value of Regional Disease Demonstration Plots in the Training of Inspectors, W. H. Martin, New Brunswick, N. J.

Administration of Seed Potato Certification, A. G. Tolaas, St. Paul, Minnesota.

The Value of the Certified Seed Test Plot in Certification, M. F. Barrus, Ithaca, N. Y.

Methods of Conducting, and the Importance of the Seed Plot in Potato Improvement Work, Donald Folsom, Orono, Maine.

Problems Confronting the Cerification Authorities, (5 minutes each).

a. Canada ..... H. T. Gussow, Canada

b. New England States ..... E. L. Newdick, Maine

c. Great Lakes States ..... H. C. Moore, Michigan

d. Great Plains States ..... H. O. Werner, Nebraska
e. Inter-Mountain States ..... F. M. Harrington, Montana
f. Western States ..... W. V. Shear, California

Consideration of Certification Committee Report.
a. Uniform Certification Standards.
b. Protecting Certified Seed Potatoes from Fraud.

**Wednesday A. M., December 30, 1925**

**Seed Potato Disinfection Methods**

Methods of Treating Seed Potatoes, as Practiced by the U. S. Dept. of Agriculture and the Various State Experiment Stations. Summary by Bert Ball, Director, National Crop Improvement Committee, Chicago, Illinois.

The Hot Formaldehyde Method of Treating Seed Potatoes, I. E. Melhus, Ames, Iowa.

Seed Potato Treatment for Rhizoctonia in northern Maine in 1925, E. S. Schultz, and R. Bonde.

Treating Seed Potatoes by the Dry Method, W. H. Martin, New Brunswick, New Jersey.

Treating of Carloads of Seed Potatoes at the Source, E. D. Askegaard, Moorhead, Minnesota.

Potato Seed Treatment in the Kaw Valley, (Lantern Slides), D. R. Porter, Manhattan, Kansas.

Appointment of committees on nominations and resolutions.

**Wednesday P. M.—December 30, 1925**

Joint session with Phytopathology Society of America—secure program from Dr. Barrus.

**Thursday A. M.—December 31, 1925**

Problems of Local Supply of Seed Potatoes in the Cornbelt Region, C. L. Fitch, Ames, Iowa.

Northern vs. Southern Grown Seed, W. H. Martin and W. M. Peacock.

Environmental Factors in Relation to the Productiveness of Seed Potatoes, H. O. Werner, Lincoln, Nebraska.

Date of Planting a Factor in Studies on Size of Seed Piece, John Bushnell, Wooster, Ohio.

**Thursday P. M.—December 31, 1925**

Report of nominating committee and election of officers.

Report of resolutions committee.

Potatoes in Irrigated Rotation Experiments at the Scottsbluff (Nebraska) Experiment Station, James A. Holden, Superintendent, Mitchell, Nebraska.

Midwest Potao Markets During the Midsummer, E. A. Stokdyk, Manhattan, Kansas.

The Future of our Association.—Discussion led by W. Stuart, Washington, D. C.

**A LIST OF KANSAS CITY HOTELS**

| Name of Hotel | Address | Prices without bath | | Prices with bath | |
|---|---|---|---|---|---|
| | | Single | Double | Single | Double |
| *Baltimore | 12th & Baltimore | 2.50-3.50 | 4.00-5.00 | 3.00- 12. | 5.00-15.00 |
| *Bray | 1114 Baltimore | 1.50-2.00 | 2.50-3.00 | 2.00-3.00 | 3.00- 5.00 |
| *Central | 12th & Central | 1.50 | 2.50 | 2.00-2.50 | 3.00- 3.50 |
| *Coates House | 10th & Broadway | 1.25-3.00 | 2.00-4.00 | 2.50-5.00 | 4.00- 7.00 |
| Cordova | 515 West 12th St. | 1.50-2.00 | 2.00-2.50 | 2.00-3.00 | 3.00- 4.50 |
| Densmore | 912 Locust | 1.00-1.50 | 2.00-2.50 | 2.00-3.00 | 3.00- 4.00 |
| *Dixon | 12th & Baltimore Ave. | 1.50-2.00 | 2.50-3.00 | 2.50-3.00 | 4.00- 5.00 |
| Glennon | 106 West 12th St. | 2.00 | 3.50-4.00 | 2.50-4.00 | 4.00- 6.00 |
| *K. C. A. C. (No ladies), | 11th & Balto. | ** | ** | 3.50-5.00 | 4.50- 7.50 |
| Keystone | 12th & Broadway | 1.25-1.50 | 1.75-2.00 | 2.00-2.50 | 3.00- 3.50 |
| *Kupper | 11th & McGee | 1.50-3.00 | 3.00-4.00 | 3.00-5.00 | 4.00- 8.00 |
| *Lucerne | Linwood & Harrison | ** | ** | 2.50-3.00 | 3.00- 5.50 |
| Mercer | 12th & McGee | 1.50-2.50 | 2.50-3.50 | 2.50-5.00 | 3.50- 6.00 |
| *Muehlebach | 12th & Baltimore | 3.00-3.50 | 4.50-5.00 | 3.50-9.00 | 5.00-12.00 |
| *New Oxford | 1222 Locust | 1.25 | 2.00 | 1.50-1.75 | 2.25- 2.50 |
| *Rasbach | 12th & Wyandotte | 1.50-3.00 | 2.50-4.00 | 2.00-4.00 | 3.00- 6.00 |
| *Savoy | 9th & Central | 1.50-2.50 | 2.50-3.50 | 2.00-4.00 | 3.00- 6.00 |
| *Sexton | 15 West 12th St. | 1.50-2.50 | 2.50-3.50 | 2.50-4.00 | 4.00- 6.00 |
| Snyderhof | 917 Oak | ** | ** | 2.50-3.50 | 3.50- 5.00 |
| *Stats | 12th & Wyandotte | ** | ** | 2.00-3.50 | 3.50- 7.50 |
| *Tanner | 917 Locust | 1.25-1.50 | 2.00-2.50 | 1.50-2.00 | 3.00- 4.00 |
| Washington | 1201 Washington | 1.50-2.00 | 2.00-3.00 | 2.00-3.00 | 3.00- 5.00 |
| *Westgate | 9th & Main | ** | ** | 1.50-3.50 | 3.00- 5.00 |

* Members of Convention Bureau.

** All rooms are provided with bath.

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# NOTES ON RECENT LITERATURE

BOOTJES, J. O.—**Die verwendung unreifer kartoffeln als saatgut (On the use of unripe potatoes as seed).**—***Deutsche Landw. Presse* 50: *118, 119, 1923.***

This is a brief review of certain experiments to determine the relative merits of ripe and unripe seed potatoes. The experiments of Mueller and Molz, Ramsay, Hutchinson, Hiltner, Munter and others are cited. The author's comments are that the principal reason for obtaining larger yields from unripe seed is that the shorter growing period in the production of immature seed affords less opportunity for tuber infection from virus attacked plants than when they are allowed to mature. He guards this statement by adding that the time of infection of the plants by mosaic, leafroll, or other virus diseases is the determining factor as to whether early harvested plants show less disease than late harvested ones. In his opinion this would account for most of the discordant results which have been recorded as to the relative yielding capacity of mature and immature seed.—**W. Stuart.**

**GLYNNE, MARY D.—Infection experiments with wart disease of potatoes. Synchytrium endobioticum (Schilb.).—*Perc. Ann. Appl. Biol. 12: 43-60, 1925.***

This reports results of efforts along several lines to devise an experimental technic adaptable to the laboratory or greenhouse for the purpose of testing the immunity or susceptibility of new varieties of potatoes, and the effect of various conditions on the development of the disease. A reliable method of pot experimentation is needed to lessen the time and cost of field methods, which heretofore have been the principal source of dependable results.—Infection by resting sporangia in the soil is dependent on a high degree of soil moisture, but it need not be maintained throughout the growth period—a wet period during the second month of growth being about as favorable to infection as constant high soil moisture. Infection occurred to about the same extent in soils of different physical character. Resting spores survive in pots at least a year in the absence of the host. The relation of spore load in the soil to infection was studied, and it was demonstratd that after inoculation at the rate of about 80,000 to 700,000 spores per pound of soil, the same amount of infection occurred; infection still resulted, but considerably diminished, from 3,500 spores per pound. —When favorable conditions for infection were maintained, i. e., a high degree of soil moisture, 80 to 100 per cent of the plants tested, even of varieties appearing in the field to be least susceptible, were infected after 3 months, but under conditions less favorable to infection the relative susceptibility of different varieties became marked.—Sprouting tubers can be tested for susceptibility by exposing them directly to germinating summer sporangia. Susceptible varieties develop wart within 3 weeks whereas immunes remain clean. This method results in a considerable saving of time over field trials.—No new hosts for wart were found tho several species belonging to the potato family were tested, and many garden weeds examined.—**F. Weiss.**

**HAMPP.—Klima und boden, die grundlagen der kartoffelzuchtung (Climate and soil, the foundation of potato culture).—*Beitrage zur Pflanzenzucht Heft 7, p. 55-64, 1924.***

In the author's opinion the art of raising potatoes is less dependent on the production of new varieties or strains than upon the intelligent selection and maintenance of the vigor of the seed stock. It is believed that climate is the most important factor in the production of good seed and that soil comes next followed by proper cultural care. The continuous production of high yields through heavy fertilization is thought to induce degeneration of seed stock. Quality rather than quantity should be the aim in the production of seed potatoes. A light soil is believed to be more suitable to seed production than heavier soils, certain exceptions are noted however. A striking correlation is believed to exist between the fitness of the soil for the production of high quality seed and its acidity. On neutral or alkaline soils there is a greater tendency

of the potato to degenerate. In neutralizing acid soils with lime the rate of application should be determined from the requirements of the plants to be grown on it, rather than on the amount indicated as necessary to neutralize its acidity. Three rules are igven for the growers' guidance (1) Modification of the soil reaction according to each crop (2) Consideration of the soil reaction when selecting varieties and strains (3) Adaptation of the rotation of crops to the soil. Of these three recommendations the latter is thought to be the more feasible except on very small farms. Varieties adapted to local conditions may be grown for many decades without degenerating. Potatoes degenerate when the climatological and soil conditions are unfavorable. Certain favorable and unfavorable localities, in Bavaria, for the production of high grade seed potatoes are mentioned and reasons presented therefor. The author differentiates between the selection of hills from a perfectly pure strain and some variety which represents a mixture of different visible or nonvisible types. Selection from the latter offers greater possibilities of improvement. In the discussion following this paper exception was taken by Dr. Ackerman to the statement that the Ihrlbach district was not suitable for the production of seed potatoes. The success of the potato breeder, Cimbal, who it was claimed had produced some excellent varieties in lower Bavaria was cited.—**W. Stuart.**

HUNT, N. REX. O'DONNELL, F. G., AND MARSHALL, RUSH P.—Steam and chemical soil disinfection with special reference to potato wart.—*Jour. Agr. Res. 31: 301-363. 1925.*

The first part of this paper under the title **The effect of steam and chemical soil treatments on the occurrence of potato wart** is of special interest in potato pathology. The remaining parts deal with the actual temperatures occurring under a steam pan used in soil sterilization, and the penetration of various chemicals used as soil disinfectants, and as such are an important contribution to the development of rational methods of soil sterilization. A summary of Part 1 follows: Soil sterilization by the inverted pan method is effective, where steam at a prssure of 90 pounds is obtainable. At this pressure the soil may be effectively sterilized with respect to wart in about 1 to 1½ hours exposure, provided it is free from stones and coarse debris, and is thoroughly worked up to the depth to which sterilization is necessary. A period shorter than 1 hour is not effective under field conditions, because heat penetration to the necessary depth is uneven. Steam sterilization is costly, being probably $1,500 per acre under best conditions, and is impracticable in the wart area because of irregular topography, presence of buildings, fences, trees, rocks, etc.—Several chemical soil treatments proved effective and much cheaper than steam. Because of the difficulty of obtaining water, dry applications are more practicable than those requiring water, tho the latter can be made with a minimum quantity of water, the remainder being furnished by natural precipitation, without impair-

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ing their efficincy. An application of ground sulfur at the rate of 2½ tons per acre and costing about $200, proved effective in exterminating the wart fungus, but resulted in severe injury to potatoes for 3 successive years. Kerosene applied in the fall at the rate of 1 pint per sq. ft. (costing about $765 per acre) prevented wart, and did not interfere with growth of potatoes the following year. Lime sulfur acted about like sulfur, but was much more costly, whereas Bordeaux, 8-8-50, at the rate of ½ gal. per sq. ft. had no injurious effect on potatoes the same season it was applied, and cost only about $300 per acre. Mercury bichloride, either dry or in solution, also was effective against wart, but its cost approaches $2,000 per acre. An important finding is that the efficiency of bichloride is increased by adding common salt, either to dry mixtures or solutions. Practicable methods of soil sterilization for wart are therefore available should occasion arise, and the control of the disease by immune varieties prove less successful than now appears reasonably to be expected.—**F. Weiss.**

**KINTZELL, W.—Beizversuche zu Kartoffeln.**—***Illus. Landw. Zeitg. 24: 288-289. 1925.***

The seed dip materials tested were Uspulum, 0.25 per cent, and Bordeaux, 2 per cent; exposure to Uspulum was 1 and 2 hrs., to Bordeaux 12 and 24 hrs. Fifty whole tubers were planted in a 12 sq. m. plot, with rows 60 cm. apart and plants 40 cm. There were 3 replications. No difference in rate of sprouting between treated or untreated plots was observed, but after about 4 weeks the plants from seed treated with Bordeaux for 24 hrs. began to grow taller, broader, and deeper green in color. They remained green about 12 days longer than other plots. The results in cwt. of yield were:

Untreated .444, Uspulum 1 hr. .447, 2 hr. .427, Bordeaux 12 hr. .443, 24 hr. .511. Plots from seed treated with Bordeaux, harvested at the time the other plots were dug gave .461 cwt. per plot; harvested at full maturity gave .557 cwt. A real gain in yield from this treatment seems to be demonstrated.

In storage the product of untreated seed showed 12 per cent of rot, the treated (not further explained) showed 7-8 per cent. Germination was more rapid and vigorous in the progeny of treated seed. The author believes that the superior vigor imparted by treating the seed was carried over into the tuber progeny.—**F. Weiss.**

**MUNTER, F.—Unreife oder reife kartoffeln als saatgut. (Immature or mature potatoes for seed).**—***Deutsche Landw. Presse* 49: *9, 10, 1922.***

The author cites London, Low, Aitkin, Nobis, Ramsay, and Hutchinson as having demonstrated the superiority of immature seed for planting purposes. By the continuous use of immature seed the author felt justified in claiming that he had a good opportunity to observe the peculiarities of the varieties under test both as to yield and disease. Even-sized tubers were always

used. In 1919 the yield from the mature seed was somewhat inferior to the immature. In 1920 the yield from immature seed of Ella, Rhineland and Deodara was larger than from the mature but in the case of Silesia and Wohltmann the reverse was true. Plants from immature seed were observed to be more vigorous and greener than from mature tubers. In 1921 the crop from mature seed was noticeably inferior to that from immature stock. In the case of Wohltmann the three years' yields from immature seed remained about constant while from the mature seed it showed a gradual reduction. In answer to the question does immature seed prevent degeneration in unsuitable soil: the author says it would almost seem to be so as less disease was noted in plants from immature seed. He also states that earlier germination was obtained from the immature tubers. Potatoes grown in sandy soil, which make excellent seed, were found to contain less starch than those grown in richer soil. In this connection he raises the question as to whether high starch content may not be correllated with lessened vigor.—**W. Stuart.**

**NEUMANN, H.—The effect of environmental conditions on the potato tuber (trans. title).—*Jour. Landw., 73 (1925), No. 1, pp. 7-38.***

Studies at Gottingen, Germany, were concerned with the influence of different soil types with varied soil moisture contents, different fertilizers, several forms of nitrogen and manure, and of cultivation on the characteristics of the potato tuber. The results obtained and conclusions based thereon may be summarized as follows:

Within a test row, the tuber seemed to lengthen with increase in weight. The form of tuber can be modified by nutrition, and indeed, the development of form showed itself independent of development of size. Nitrogen is considered as a form-altering factor, causing elongation of the tuber, while potassium-phosphorous fertilization and high moisture favor thickening. The influence of the soil on tuber form probably depends on its air content, a soil with better aeration producing a shorter type. Soil of sandstone origin gave the shortest types and the heavier soils produced elongated tubers. Cultivation during the vegetative period seemed responsible for a shorter form, and manured plats produced a shorter form than unmanured plats.

The relation between long cylindrical form and low starch content and short flat form and high starch content was regularly confirmed. The size of the lenticels was increased through enhanced water supply. The depth to which lenticels developed was apparently not related to the factors studied.—**H. M. Steece.**

**ROACH, W. A., GLYNNE, MARY D., BRIERLEY, WM. B., AND CROWTHER, E. M.—Experiments on the control of wart disease of potatoes by soil treatment with particular reference to the use of sulfur.—*Ann Appl. Biol.* 12: *152-190. 2 pl., 13 fig. 1925.***

The paper presented under this title is modestly stated by the

authors to be essentially a progress report, but is establishes the importance of what appears to be a new principle in the use of chemicals more or less completely to free soil of fungus pests, and reports results of great interest and importance relating to the control of potato wart by soil treatment.

A summary of the results follows: The culture of susceptible varieties of potatoes is, for one reason or another, still desirable in parts of England infested by wart disease particularly where only small and isolated diseased areas occur, yet whose existence results in serious hindrance to marketing the rest of the crop. A method of killing the resting spores of the wart fungus in contaminated soil is needed. The hypothesis was adopted at the outset, that the failure of all previous attempts to sterilize soil contaminated by this disease through the use of chemicals may have been due to lack of thorough incorporation of the material with the soil. It is possible that much lighter applications of chemical, if thoroughly distributed, would be effective where very heavy applications, imperfectly incorporated have failed, and would be cheaper and less injurious to succeeding crops.

In the first experiments efforts were directed toward securing the necessary thoroughness of distribution of the fungicide by hand-mixing and the use of pot containers. Pot experiments proved particularly inadequate in securing reliable infection results so resort was made to field plots, and a method practicable on a large scale was sought for securing thorough incorporation of chemicals with soil. This was attained through the use of a special tilling machine with revolving tines, which could be set to operate at a depth of 10 inches. After passage once with the tiller a thick layer of chemical spread on the surface of the soil disappeared, and results in disease control were much superior to those obtained by careful hand spading.

In the pot experiments the influence of steaming for 3 hours alone and in combination with chemicals, was tested, the general conclusion being that this increased the effectiveness of the fungicides. Sulfur, polysulfides, formaldehyde, dichlorchresol and nitrobenzene caused reduction in the amount of disease.

A new method of estimating the amount of disease was devised which took account of, or eliminated, such disturbing factors as the different amount of devlopment of individual infections, reinfection from a small number of primary sources, lack of uniformity of soil infestation, and position of the infected part, i. e., whether below or above ground.

"In 1924, a year of very heavy disease, it was proved at Ormskirk that when the dose of ground sulfur was increased through 1, 2, 3, 4, 5, and 10 cwts. per acre, the degree of infection was reduced in direct ratio from 73 per cent, the value for untreated soil, to 8 per cent for an application of 10 cwts. per acre. Graphical analysis showed that for this light sandy soil, an application of 11.2 cwts. should be above the minimum to free it completely of disease,

if recontamination is prevented. On heavy clay soil, much heavier applications, up to 40 cwts. were necessary to produce clean plots.

Inoculated sulfur proved no more effective than ordinary ground sulfur, and in one case was decidedly less effective, in controlling wart, though for equal dosage the effects on soil reaction and the amount of common scab infection were similar. Other evidence also points to the absence of a direct relation between the efficiency of sulfur and sulfur compounds as fungicides against wart, and their effect on soil reaction. Some intermediate oxidation compound is probably the active agent.

"The sulfur treatment will be put to a large scale critical test in 1925-1926; but results to date seem to show that a feasible method of eradication of wart disease from contaminated land has been found."

This conclusion is of interest in this country though the opinion prevails here that, owing to the isolation of our wart infested areas and the effectiveness of the quarantine enforced in them, the use of immune varieties affords an adequate check on this disease. The results of the work on chemical sterilization carried out in this country, which are still in press, receive considerable support from the more comprehensive experiments now reported from England. This work likewise points to the effectiveness of sulfur as a fungicide against wart, though in the American experiments much heavier dosages were applied. This is offset to some extent by the probably less thorough incorporation with the soil attained here, and the fact that, because it was possible largely to prevent re-infestation in our plots, they were allowed to stand for 3 years, and still gave no evidence of disease. —**Freeman Weiss.**

**RUDNO, G. VON.—Beobachtungenueber vegetative und geschlechtlicke aufspaltung bei kartoffeln (Observations on vegetative and sexual division in potatoes).—*Zeitsch. f. Pflanzenzucht* 10: *291-294, 1925.***

In 1921 some white flowered plants were observed in a field of Parnassia potatoes of which the flower is lilac in color. Parnassia was grown from seed in 1919 and neither in that year nor in 1920 did it show a single white flower. The tubers from white flowered plants were grown in 1922 and about 50 specimens were isolated. The corolla of the flower of these plants aside from being white was observed to be different from that of Parnassia and contrary to it the plants produced numerous and unusually large seed balls and matured about eight days earlier. In order to permit of closer observation 150 specimens were grown in a farm garden in 1923. Among these two were noted each of which had a branch bearing the typical lilac flowers of Parnassia and with a double corolla while the other branches bore white flowers showing different characters. Tubers from the two plants noted were grown in 1924. The six tubers from one plant all produced white flowers while the ten tubers from the other developed eight white and two lilac flowered plants. The two lilac flowered plants are

thought by the author to have had their origin from the branch producing lilac flowers in 1923. No attempt, however, is made to explain the absence of lilac flowering plants in the progeny of the other plant. The white flowered strain is assumed to be a vegetative hybrid. The continued modification of the hybrid, white flowers, abundant development of seeds, large seed balls and early maturing is thought to be explainable on the basis of spontaneous variation brought about through the modification of an inheritance factor which in turn frequently causes modification of several external visible characters. Seedlings were grown in 1923 from seed balls produced in typical Parnassia plants and from the white flowered type, and a great similarity in the offspring was noted. An account then follows of crossing white flowered plants with the variety Hindenburg but it is impossible to see how the data secured from the seedlings of such a cross furnish any evidence supporting the vegetative hybrid theory previously advanced.—**W. Stuart.**

**SEELHORST, C. V.—On Phenomena of inheritance in potatoes (trans. title).—*Jour. f. Landwirtsch.* 66: *pp. 141-162. Berlin, 1918.***

Data are presented on experiments conducted during the year 1917 which were a continuation of previous work, the results of which were published in 1900 and 1904, respectively.

To determine whether high yield and large numbers of tubers are maintained in succeeding vegetative generations a large number of both high yielding and low yielding hills were selected from 5 varieties. Tabulations of the data from the resulting crop show that in most cases the largest yields were obtained from the high yielding parent hills; that the number of tubers was smaller in the hills that came from the small parent hills, and that the smallest tubers from the large parent hills produced larger crops than the largest tubers from the small parent hills.

With respect to the practical application of these results the author concludes that maximum crops can be secured only by the use of seed from high yielding hills and suggests that a sufficient amount of stock from such hills be grown in a seed plot each year to provide seed for the main crop the succeeding year.—**C. F. Clark.**

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